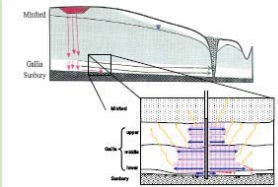


External Technical Review Summary

United States Department of Energy Office of Environmental Management (DOE-EM)

External Technical Review of the X-701B Groundwater Remedy, Portsmouth, Ohio

Why DOE-EM Did This Review



The Department of Energy (DOE) Portsmouth Paducah Project Office (PPPO) has responsibility for

remediation of the X-701B ground water plume with the key contaminant of trichloroethene (TCE). The remedy has been divided into four phases: Phase I- Initial Source Area Treatment, Phase II-Expanded Source Area Treatment, Phase III-Evaluation and Reporting, and Phase IV- Downgradient Remediation and Confirmation of Source Area Treatment. Phase II treatment has injected catalyzed hydrogen peroxide without meeting the remediation goal of $< 5\mu\text{g/L}$ TCE. *The external review objectives were: (1) to assess the ongoing oxidant-based treatment technology, (2) to provide a specific recommendation versus continuing oxidant injections and (3) to provide recommendations of alternatives to the current remediation strategy for the X-701B plume.*

What the ETR Team Recommended

The ETR Team recommends implementing innovative characterization to delineate target source zones to provide focus for future source treatments, to reduce costs, and to minimize collateral damage associated with the treatment. An overarching recommendation was to modify the pump and treat to increase effectiveness in terms of contaminant extraction rate and to support other technologies. In addition to characterization, a combination of technologies that would work synergistically should be used, since none of

the identified technologies used alone are likely to achieve remedial objectives in a timely manner. The following source remediation techniques should be considered:

- Oxidants-Consider the blending of solid oxidants, such as persulfates, beneath the former source basin (in lieu of a cap) and focusing additional injections toward the Gallia Sunbury contact using high strength long-lived oxidants. It is recommended that any oxidant method be combined with hydraulic control.
- Thermal-This technology class is potentially viable if deployment can be performed under a fixed price and guaranteed performance contract by a reliable vendor.

Soil blending of oxidant, focused TCE characterization, targeted injection of long-lived oxidant solution, and modified pump-and-treat followed by a passive technique such as wetland treatment would be an example of a simple combination of treatment technologies to be considered.

What the ETR Team Found

The independent review team found that the mass of TCE in the middle and upper Gallia source zone significantly decreased as a result of the oxidant injection, indicating measurable progress in remediation. However, the mass of TCE in the lower Gallia (near the contact with the underlying Sunbury Shale) was unchanged overall and increased in some areas. Groundwater concentrations were unchanged or increased after each Phase II injection, and all measurements of TCE in the groundwater were 100 to 10,000 times greater than the remediation goal of $5\mu\text{g/L}$. The team determined that the quantity of oxidant injected during the Phase I pilot and the first five Phase II injections was significantly less than the amount required to meet the measured soil oxidant demand. Rapid decomposition of the hydrogen peroxide and limited injection volumes likely hindered progress toward remediation goals. The time frame for success is expected to be decades versus a few years.

To view the full ETR reports, please visit this web site:
<http://www.em.doe.gov/Pages/ExternalTechReviews.aspx>

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The purpose of an External Technical Review (ETR) is to reduce technical risk and uncertainty. ETRs provide pertinent information for DOE-EM to assess technical risk associated with projects and develop strategies for reducing the technical risk and to provide technical information needed to support critical project decisions. Technical risk reduction increases the probability of successful implementation of technical scope. In general, ETRs assesses technical bases, technology development, and technical risk identification and handling strategies.



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